Runoff and Water Stress

Using the Noah33+CHIRPS+MERRA2 FLDAS runs (McNally et al. 2017), we first compute total runoff (surface runoff + subsurface runoff) in mm/sec and convert this to a volume (m3) per pixel for the month. These data are then summarized by Pfafstetter basin level 6 from the USGS HDMA database (Verdin 2017), and shown in the “Runoff <Month Year>” map.

Next we compute, Water Stress (i.e. runoff per capita) using WorldPop (http://www.worldpop.org) Africa population estimates (Linard et al. 2012) for the year 2015. These data are aggregated to the Pfafstetter basin level 6. Basin level runoff is then divided by these basin level population estimates to derive runoff per capita.

Runoff per capita is then classified per Falkenmark (1989), we then divided by 12, to get monthly estimates of water supply thresholds (Table 1). These results are shown in the “Water Stress <Month Year>” map.

Table 1. Annual and monthly Falkenmark categories

category	**m3/yr/cap**	**m3/mo/cap**
no stress	>1700	> 142
stress	1000-1700	83-142
scarcity	500-1000	41-82
absolute scarcity	<500	< 41

Water Stress Anomalies

The mean runoff for each month (Climatology) was calculated based on the 1982-2016 historic record and this runoff was summarized to the Level 6 Pfafstetter polygons, as well. Anomalies are calculated as percent of mean as:

Anomaly (%) = ((“Runoff <Month Year>: - “Climatology <Month>”) /“Climatology <Month>”) * 100

References

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